

REMARKS/ARGUMENTS

The following remarks are responsive to the points raised by the Office Action dated February 15, 2006. In view of the following remarks, reconsideration is respectfully requested.

The Pending Claims

In this amendment, claim 5 is cancelled, so that claims 1-4 and 5-13 are currently pending.

Claim 1 is amended to describe the invention more clearly. No new matter has been added, and the basis for the amended claim language may be found within the original specification, claims, and drawings. The amendment to claim 1 is supported at, for example, page 16, lines 12-16 of the specification. Entry of the above is respectfully requested.

Provisional Double Patenting Rejections

Claims 1-8 and 13 were provisionally rejected under the doctrine of obviousness-type double patenting as unpatentable over claims 64-66 and 73-75 of copending Application No. 10/926,321 to Sakurai et al. (hereinafter, "the '321 application").

Claim 1 was provisionally rejected under the doctrine of obviousness-type double patenting as unpatentable over claim 21 of copending Application No. 10/932,319 to Sakurai et al. (hereinafter, "the '319 application").

Applicants do not address the provisional double patenting rejections. Because both the '321 and the '319 applications are currently undergoing prosecution, it is not possible to determine the scope of any claims that may issue from these applications, if any claims issue at all. Referral to the Public PAIR system has revealed that no Office Action has been issued in either application to date. For these reasons, and because these rejections are presently only provisional, Applicants do not address them here.

Rejection under 35 U.S.C. § 103

Claims 1-13 were rejected under 35 U.S.C. § 103 as unpatentable over JP 2002-060691 to Hayashi (hereinafter, "Hayashi") in view of JP 2001-098218 to Nobe (hereinafter, "Nobe").

This rejection is respectfully traversed.

The present Office Action (mailed February 15, 2006) maintains the obviousness rejection as set forth in paragraph 9 of the previous Office Action (mailed September 30, 2005).

For that reason, subsequent references to “the Office Action” will refer to the September 30th Office Action.

To maintain an obviousness rejection, the cited combination of references must teach or suggest each and every element of the claims (MPEP § 2143). The obviousness rejection of the currently pending claims cannot be maintained because the cited combination of Hayashi and Nobe do not teach all of the elements of amended claim 1.

Amended claim 1 recites three heat treatments. In the first heat treatment, the solvent is evaporated from the film-forming composition. In the second heat treatment, polymerization of polysiloxane is promoted in an inert-gas atmosphere. In the third heat treatment, the pore-forming agent is vaporized in an oxidizing-gas ambient *at a temperature that is lower than the temperature of the polymerization-promoting second heat treatment.*

The claimed method advantageously solves the problems that accompany conventional methods. As explained in the specification, conventional methods involve applying polysiloxane resin onto a substrate and applying heat (specification, page 2, lines 5-30). The heat treatment cures the polysiloxane and, at the same time, decomposes and evaporates the pore-forming agent. If there is substantial decomposition of the pore-forming agent before the curing reaction of polysiloxane is completed, the size of the pores becomes too small and the porosity of the film is lowered. To avoid this problem, other conventional methods decompose the pore-forming agent at a temperature that is higher than the temperature at which polysiloxane is cured. However, heat treatment at such a high temperature compromises the reliability of the copper wiring. Vaporizing the pore-forming agent in a third heat treatment at a temperature that is lower than the temperature of the polymerization-promoting second heat treatment, as claimed, advantageously solves these problems, maintaining the integrity of the copper wiring, the desired porosity, and dielectric constant.

According to the Office Action, Hayashi discloses a method of forming a porous film on a semiconductor substrate, which is derived from a composition comprising a polysiloxane, a porogen such as polyalkylene oxide, an onium salt such as an ammonium salt, and a solvent. The Office Action correctly acknowledged that Hayashi is silent on a separate heat treatment for vaporizing the porogen. The Office Action cited paragraphs [0036]-[0037] of Nobe as teaching temperatures for the evaporation of the porogen.

Nobe, however, fails to describe the vaporization of the pore-forming agent at a temperature that is lower than the temperature of the polymerization-promoting second heat treatment, as claimed in amended claim 1. In direct contravention of amended claim 1,

paragraphs [0036]-[0037] of Nobe describe heat stages of consecutively *increasing* temperature: a condensation reaction of 80-200° C, baking of the siloxane oligomer at 200-350° C, and hardening at 350-500° C. Nobe consistently describes heating stages of consecutively increasing temperature, see, e.g., paragraphs [0012], [0042], [0044], and [0046]. Nowhere does Nobe describe vaporization of the pore-forming agent in a *third* heat treatment at a temperature that is *lower than* the temperature of the polymerization-promoting second heat treatment, as claimed in amended claim 1.

Accordingly, neither Hayashi nor Nobe, either alone or in combination, teaches or suggests vaporizing the pore-forming agent in an oxidizing-gas ambient in a third heat treatment at a temperature that is lower than the temperature of the polymerization-promoting second heat treatment, as claimed in claim 1. Moreover, these references do not provide any suggestion or motivation to vaporize the pore-forming agent in a third heat treatment that is lower than the second heat treatment, as claimed. Therefore, the combination of Hayashi and Nobe does not render the present claims obvious.

Because amended independent claim 1 is allowable for the reasons set forth above, the dependent claims are also allowable because they depend from patentable amended claim 1.

Conclusion

For the reasons set forth above, reconsideration of the rejections is respectfully requested.

If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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